# Status of STAR Multiwire Chamber

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The STAR MultiWire Chamber (MWC) system reads out 7680 anode wires of the Time Projection Chamber (TPC) on each beam crossing, for use in the trigger[1]. Each TPC sector is divided into 4 segments for MWC readout sections, so the 24 TPC sectors map into 96 MWC sections, each containing 80 wires. Each RHIC crossing (every 105 nsec), the MWC electronics outputs the numbers of wires that fired in that crossing (i.e. 0-80). This number can be mapped in the trigger system to the estimated number of minimum ionizing particles (MIPs) in that group. If an event triggers, the trigger will record MWC signal in the triggered crossing plus up to 5 RHIC crossings before and after the trigger.

When a charged particle goes through the MWC it typically deposits ionization in several cells. Some ionization clusters take as much as 300 nsec to drift to the anode, and the rise time of the amplifier/shaper is about 100 nsec[2]. As the result, depending on the anode threshold, signals from the MWC can be several RHIC crossings late compared to the other trigger detectors in STAR. In order to find the optimal threshold for the MWC, to study trigger efficiency and determine the conversion factor between the number of wires and number of MIPs, we need to simulate time development of the MWC signal in all 11 RHIC crossings. A simulation package has been written that accounts correctly for the drift of the ionisation within the chamber, signal formation in the amplifier/ shaper and electronic noise.

Another software package matches reconstructed charged tracks in the TPC with the hits in the MWC, which allows to estimate efficiency from the real data collected during the summer 2000 run. The MWC was run at the threshold equal to 0.5 MIP maximum signal. Figure 1 shows time distribution of the sum of signals from 1000 events in which one sector of the MWC was hit by one particle. The maximal signal is obtained 4 crossings after the triggered RHIC crossing.

## References

[1] V. Morozov and the STAR Collaboration, "A Multi-Wire Chamber Readout for STAR", talk presented at DNP Meeting, Oct. 2000.

[2] R. Bossingham - Ionization Drift in the STAR TPC, `www.star.bnl.gov/STAR/html/tpc_l/tpc.html`

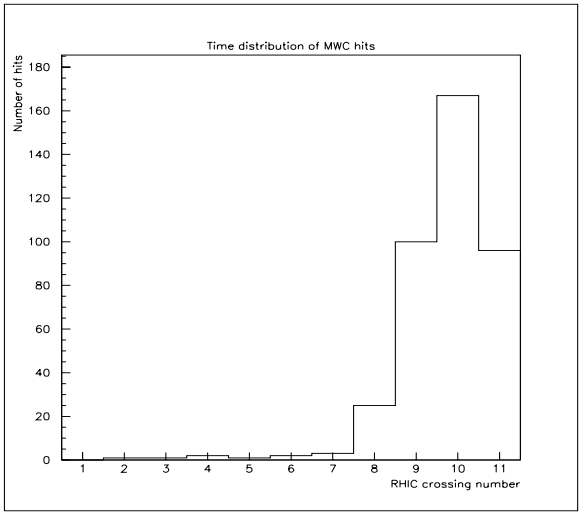


Figure 1: Sum of signals in each of 11 consecutive RHIC crossings formed by 1000 particles going through the MWC. Crossing # 6 is the triggered crossing.

*Footnotes and References*

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